29. *(New)* An optical WDM network comprising at least two nodes interconnected by a bidirectional optical link, at least one of the nodes comprising

at least two pairs of ordinary optical transmitters and ordinary optical receivers, each pair including an ordinary optical transmitter receiving electrical signals and converting the received electrical signals to issued first optical signals and an ordinary optical receiver receiving optical signals and converting them to electrical signals,

ordinary transponders, each ordinary transponder receiving the issued first optical signals from only one of the ordinary optical transmitters of the pairs and converting the received signals to issued second optical signals of a well defined wavelength band, the wavelength bands of the second optical signals issued by different ones of the ordinary transponders being separate from each other,

a first optical multiplexer or combiner connected to receive the second optical signals issued by the ordinary transponders of the at least one node, the first optical multiplexer or combiner combining the second optical signals to issue a combined optical signal on an optical fiber included in the bidirectional link interconnecting the at least one node and another node,

a spare transponder connected to receive, for a failure of an ordinary transponder of the at least one node, the first optical signals, which are to be received by the ordinary transponder, and to convert the received first optical signals to issued third optical signals of a well defined wavelength band separate from the wavelength bands of the second optical signals issued by the ordinary transponders in the at least one node, the spare transponder connected to the first optical multiplexer or combiner of the at least one node

to provide the third optical signals to the first optical multiplexer or combiner which combines the third optical signals issued by the spare transponder of the at least one node with the second optical signals issued by the ordinary transponders of the at least one node to issue a combined optical signal on the optical fiber, and

wherein said at least one of the nodes further comprises first optical switches, each first optical switch having an input and a first output and a second output, the input of the first optical switch connected to one of the ordinary optical transmitters of the at least one node and the first output connected to that ordinary transponder which is connected to receive the first optical signals issued by said one of the ordinary optical transmitters of the at least one node to forward optical signals received on the input of the first optical switch to that ordinary transponder, and the second output connected to the spare transponder to forward optical signals received on the input of the first optical switch to the spare transponder, depending on a position of the first optical switch.

30. *(New)* The optical WDM network of claim 29, wherein each ordinary transponder of the at least one node comprises an input loss detector controlling that first optical switch, the first output of which is connected to the ordinary transponder.

31. *(New)* The optical WDM network of claim 29, wherein the at least one node further comprises a second optical multiplexer or combiner having an output connected to an input of the spare transponder and having inputs connected to the second outputs of the first optical switches to receive the first optical signals issued by the ordinary optical

transmitters and to forward the received first optical signals on the output of the second optical multiplexer or combiner to the spare transponder of the at least one node.

32. *(New)* The optical WDM network of claim 29, wherein the at least one node further comprises a second optical switch having one output and a plurality of inputs connected to the second outputs of the first optical switches, and the output of the second optical switch connected to the input of the spare transponder, the second optical switch arranged to connect one of its inputs to its output in order to forward the first optical signals issued by one of the ordinary optical transmitters of the at least one node to the spare transponder of the at least one node.

33. *(New)* An optical WDM network comprising at least two nodes interconnected by a bidirectional optical link, at least one of the nodes comprising:

at least two pairs of ordinary optical transmitters and ordinary optical receivers, each pair comprising an ordinary optical transmitter receiving electrical signals and converting the received electrical signals to optical signals and issuing the optical signals to another node and an ordinary optical receiver receiving optical signals from the other node and converting the received optical signals to electrical signals, and

spare optical transmitters, one spare optical transmitter arranged together with an ordinary optical transmitter in a pair, the spare optical transmitter and the ordinary optical transmitter of a pair receiving the same electrical signals and converting the received

electrical signals to optical signals and the spare optical transmitter arranged to issue the optical signals to the other node, if the ordinary optical transmitter fails.

34. *(New)* The optical WDM network of claim 33, wherein the at least one node further comprises first optical switches, each first optical switch connected to an ordinary optical transmitter and a spare optical transmitter of a pair to forward optical signals from only one of the ordinary optical transmitter and the spare optical transmitter.

~~35. *(New)* The optical WDM network of claim 33, wherein each first optical~~ switch in the at least one node is arranged to connect, in a first position, the ordinary optical transmitter to an ordinary transponder, the ordinary transponder converting received optical signals to issued optical signals of a well defined wavelength band, the wavelength bands of different ordinary transponders in the at least one node being separate from each other, the optical signals issued by the ordinary transponders of the at least one node provided to an optical multiplexer or combiner combining the optical signals to issue them on an optical fiber connected to another node, and to connect, in a second position of the first optical switch, an ordinary transmitter to a spare transponder, the spare transponder converting received optical signals to issued optical signals of a well defined wavelength band, the wavelength band of the spare transponder being separate from the wavelength bands of the ordinary transponders in the at least one node, the optical signals issued by the spare transponder provided to the optical multiplexer or combiner to be also issued on the optical fiber.

36. *(New)* The optical WDM network of claim 35, wherein in the first position of one of the first optical switches of the at least one node the spare optical transmitter which is connected to said one of the first optical switches is connected through said one of the first optical switches to the spare transponder through a second switch, the second switch allowing optical signals from at most one spare optical transmitter to reach the spare transponder.

37. *(New)* The optical WDM network of claim 36, wherein in the second position of one of the first optical switches of the at least one node the ordinary optical transmitter which is connected to said one of the first optical switched is connected through the first optical switch to the spare transponder through the second switch, the second switch allowing optical signals from at most one ordinary optical transmitter to reach the spare transponder.

38. *(New)* The optical WDM network of claim 33, wherein in the second position of one of the first optical switches of the at least one node the spare optical transmitter which is connected to said one of the first optical switches is connected to a respective ordinary transponder.

39. *(New)* The optical WDM network of claim 35, wherein each ordinary optical transmitter of the at least one node is connected to an ordinary transponder, one ordinary

transponder arranged for each ordinary optical transmitter, each of the ordinary transponders arranged to convert received optical signals to issued optical signals of a well defined wavelength band, the wavelength bands of different ordinary transponders in the at least one node being separate from each other, the optical signals issued by the ordinary transponders of the at least one node provided to an optical multiplexer or combiner combining the signals to issue them on an optical fiber connected to another node, and the spare optical transmitters connected to a spare transponder, the spare transponder converting received optical signals to issued optical signals of a well defined wavelength band, the wavelength band of the spare transponder being separate from the wavelength bands of the ordinary transponders in the at least one node, the optical signals issued by the spare transponder provided to the optical multiplexer or combiner, the connection of the spare optical transmitters to the spare transponder being made in such a way that the spare transponder receives at most optical signals issued by at most one spare transmitter.

40. *(New)* The optical WDM network of claim 33, wherein all the ordinary receivers of the at least one node are connected to a single demultiplexer or filter and convert received optical signals to electrical signals.

41. *(New)* The optical WDM network of claim 33, wherein all the ordinary receivers of the at least one node are connected to a single demultiplexer or filter and convert received optical signals to electrical signals, a switch provided to conduct an

optical signal from the demultiplexer or filter to at most one of the ordinary receivers, this optical signal being in the same wavelength band as the optical signals issued by a spare transponder.

42. *(New)* The optical WDM network of claim 33, wherein the at least one node further comprises spare optical receivers, one spare optical receiver arranged together with an ordinary optical receiver in a pair, the spare optical receiver and the ordinary optical receiver of a pair converting received optical signals to electrical signals and connected to output electrical signals to the same output terminal, so that the spare optical receiver delivers electrical signals to the output terminal, if the ordinary optical receiver cannot deliver electrical signals.

43. *(New)* The optical WDM network of claim 42, wherein all the ordinary receivers of the at least one node are connected to a single demultiplexer or filter and convert received optical signals to electrical signals, each spare receiver connected to the demultiplexer or filter through a switch, the switch having a plurality of outputs, each output connected to a different one of the spare optical receivers, and the switch arranged to forward a signal from the demultiplexer or filter to at most one of the spare optical receivers.

44. *(New)* The optical WDM network of claim 43, wherein a signal which is forwarded from the demultiplexer or filter to one of the spare optical receivers is in the

same wavelength band as the optical signals issued by a spare transponder of the at least one node.

45. *(New)* The optical WDM network of claim 43, wherein a signal which is forwarded from the demultiplexer or filter of the at least one node to one of the spare optical receivers of the at least one node is in the same wavelength band as the optical signals issued by the ordinary transmitter in the pair of an ordinary transmitter and that ordinary receiver, with which the spare receiver is included in a pair.

46. *(New)* A node for connection to another node by a bidirectional optical link in an optical WDM network, the node comprising:

at least two pairs of ordinary optical transmitters and ordinary optical receivers, each pair including an ordinary optical transmitter receiving electrical signals and converting the received electrical signals to issued first optical signals and an ordinary optical receiver receiving optical signals and converting them to electrical signals,

ordinary transponders, each ordinary transponder receiving the issued first optical signals from only one of the ordinary optical transmitters of the pairs and converting the received signals to issued second optical signals of a well defined wavelength band, the wavelength bands of the second optical signals issued by different ones of the ordinary transponders being separate from each other,

a first optical multiplexer or combiner connected to receive the second optical signals issued by the ordinary transponders, the first optical multiplexer or combiner

combining the second optical signals to issue a combined optical signal on an optical fiber included in a bidirectional link interconnecting the node and the other node,

a spare transponder connected to receive, for a failure of an ordinary transponder, the first optical signals, which are to be received by the ordinary transponder, and to convert the received first optical signals to issued third optical signals of a well defined wavelength band separate from the wavelength bands of the second optical signals issued by the ordinary transponders, the spare transponder connected to the first optical multiplexer or combiner to provide the third optical signals to the first optical multiplexer or combiner which combines the third optical signals issued by the spare transponder of the node with the second optical signals issued by the ordinary transponders of the node to issue a combined optical signal on the optical fiber, and

wherein the node further comprises first optical switches, each first optical switch having an input and a first output and a second output, the input of the first optical switch connected to one of the ordinary optical transmitters of the node and the first output connected to that ordinary transponder which is connected to receive the first optical signals issued by said one of the ordinary optical transmitters of the node to forward optical signals received on the input of the first optical switch to that ordinary transponder, and the second output connected to the spare transponder to forward optical signals received on the input of the first optical switch to the spare transponder, depending on a position of the first optical switch.

47. *(New)* The node of claim 46, wherein each ordinary transponder of the node comprises an input loss detector controlling that first optical switch, the first output of which is connected to the ordinary transponder.

48. *(New)* The node of claim 46, further comprising a second optical multiplexer or combiner having an output connected to an input of the spare transponder and having inputs connected to the second outputs of the first optical switches to receive the first optical signals issued by the ordinary optical transmitters and to forward the received first optical signals on the output of the second optical multiplexer or combiner to the spare transponder.

49. *(New)* The node of claim 46, further comprising a second optical switch having one output and a plurality of inputs connected to the second outputs of the first optical switches, and the output of the second optical switch connected to the input of the spare transponder, the second optical switch arranged to connect one of its inputs to its output in order to forward the first optical signals issued by one of the ordinary optical transmitters to the spare transponder.

50. *(New)* A node for connection to another node by a bidirectional optical link in an optical WDM network, the node comprising:

at least two pairs of ordinary optical transmitters and ordinary optical receivers, each pair comprising an ordinary optical transmitter receiving electrical signals and

converting the received electrical signals to optical signals and issuing the optical signals to another node and an ordinary optical receiver receiving optical signals from the other node and converting the received optical signals to electrical signals,

spare optical transmitters, one spare optical transmitter arranged together with an ordinary optical transmitter in a pair, the spare optical transmitter and the ordinary optical transmitter of a pair receiving the same electrical signals and converting the received electrical signals to optical signals and the spare optical transmitter arranged to issue the optical signals to the other node, if the ordinary optical transmitter fails.

51. *(New)* The node of claim 50, further comprising first optical switches, each first optical switch connected to an ordinary optical transmitter and a spare optical transmitter of a pair to forward optical signals from only one of the ordinary optical transmitter and the spare optical transmitter.

52. ~~*(New)*~~ The node of claim 50, wherein each first optical switch is arranged to connect, in a first position, the ordinary optical transmitter to an ordinary transponder, the ordinary transponder converting received optical signals to issued optical signals of a well defined wavelength band, the wavelength bands of different ordinary transponders being separate from each other, the optical signals issued by the ordinary transponders provided to an optical multiplexer or combiner combining the optical signals to issue them on an optical fiber connected to another node, and to connect, in a second position of the first optical ~~switch, an ordinary transmitter to a spare transponder~~, the spare

transponder converting received optical signals to issued optical signals of a well defined wavelength band, the wavelength band of the spare transponder being separate from the wavelength bands of the ordinary transponders, the optical signals issued by the spare transponder provided to the optical multiplexer or combiner to be also issued on the optical fiber.

53. *(New)* The node of claim 52, wherein in the first position of one of the first optical switches the spare optical transmitter which is connected to said one of the first optical switches is connected through said one of the first optical switches to the spare transponder through a second switch, the second switch allowing optical signals from at most one spare optical transmitter to reach the spare transponder.

54. *(New)* The node of claim 53, wherein in the second position of one of the first optical switches the ordinary optical transmitter which is connected to said one of the first optical switched is connected through the first optical switch to the spare transponder through the second switch, the second switch allowing optical signals from at most one ordinary optical transmitter to reach the spare transponder.

55. *(New)* The node of claim 50, wherein in the second position of one of the first optical switches the spare optical transmitter which is connected to said one of the first optical switches is connected to a respective ordinary transponder.

56. *(New)* The node of claims 52, wherein each ordinary optical transmitter is connected to an ordinary transponder, one ordinary transponder arranged for each ordinary optical transmitter, each of the ordinary transponders arranged to convert received optical signals to issued optical signals of a well defined wavelength band, the wavelength bands of different ordinary transponders being separate from each other, the optical signals issued by the ordinary transponders provided to an optical multiplexer or combiner combining the signals to issue them on an optical fiber connected to another node, and the spare optical transmitters connected to a spare transponder, the spare transponder converting received optical signals to issued optical signals of a well defined wavelength band, the wavelength band of the spare transponder being separate from the wavelength bands of the ordinary transponders, the optical signals issued by the spare transponder provided to the optical multiplexer or combiner, the connection of the spare optical transmitters to the spare transponder being made in such a way that the spare transponder receives at most optical signals issued by at most one spare transmitter.

57. *(New)* The node of claim 50, wherein all the ordinary receivers are connected to a single demultiplexer or filter and convert received optical signals to electrical signals.

58. *(New)* The node of claim 50, wherein all the ordinary receivers are connected to a single demultiplexer or filter and convert received optical signals to electrical signals, a switch provided to conduct an optical signal from the demultiplexer or filter to at most

one of the ordinary receivers, this optical signal being in the same wavelength band as the optical signals issued by a spare transponder.

59. *(New)* The node of claim 50, further comprising spare optical receivers, one spare optical receiver arranged together with an ordinary optical receiver in a pair, the spare optical receiver and the ordinary optical receiver of a pair converting received optical signals to electrical signals and connected to output electrical signals to the same output terminal, so that the spare optical receiver delivers electrical signals to the output terminal, if the ordinary optical receiver cannot deliver electrical signals.

60. *(New)* The node of claim 59, wherein all the ordinary receivers are connected to a single demultiplexer or filter and convert received optical signals to electrical signals, each spare receiver connected to the demultiplexer or filter through a switch, the switch having a plurality of outputs, each output connected to a different one of the spare optical receivers, and the switch arranged to forward a signal from the demultiplexer or filter to at most one of the spare optical receivers.

61. *(New)* The node of claim 60, wherein a signal which is forwarded from the demultiplexer or filter to one of the spare optical receivers is in the same wavelength band as the optical signals issued by a spare transponder of the at least one node.